

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of)

Amendment of Part 90 of the)
Commission's Rules To Provide)
for the Use of the 220-222 MHz Band)
by the Private Land Mobile)
Radio Service)

PR Docket No. 89-552

DOCKET FILE COPY ORIGINAL

Implementation of Sections 3(n) and 332)
of the Communications Act)

GN Docket No. 93-252

Regulatory Treatment of Mobile Services)

To: The Commission

COMMENTS OF SEA INC.

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September 13, 1995

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To: The Commission

COMMENTS OF SEA INC.

SEA Inc. ("SEA"), by its undersigned counsel, and pursuant to Section 1.415 of the Commission's Rules and Regulations, hereby files its comments in the above-captioned proceeding in response to the Commission's Fourth Notice of Proposed Rulemaking, FCC 95-381, released August 29, 1995 (4th NPRM), in which the Commission proposed rules whereby incumbent 220 MHz licensees will be permitted to modify their existing authorizations by changing their transmitter sites.

As the Commission is aware, SEA has been involved since 1981 in the development of 5 kHz narrowband technology for land mobile radio systems. SEA manufactures and markets narrowband linear modulation wireless equipment that is used in voice and data operations in 5 kHz wide channels on frequencies allocated in the 220

MHz service. SEA has a full line of type-accepted narrowband mobile, base and portable radio products for the 220-222 MHz frequency band. The company's experience in introducing systems and products into the 220-222 MHz band, as well as its unparalleled and long-standing commitment to the success of this band, makes SEA uniquely qualified to discuss the critical issue of site modifications. Indeed, no other manufacturer has a track record of narrowband product development and system implementation which comes close to matching that of SEA.

SEA applauds the Commission for taking action, at long last, to address the problem of site modifications for licensees in the 220 MHz service. SEA agrees with the Commission that it is in the public interest to take steps to allow existing licensees to modify their licenses expeditiously and to avoid the time-consuming procedural delays that would result from mutually exclusive situations. To accomplish these objectives, the Commission has proposed to allow site changes in a manner that will eliminate the possibility of mutual exclusivity resulting from base station relocations. The Commission's proposal would achieve this by allowing licensees to change their transmitter sites to locations anywhere within their existing service area so long as they maintain a signal strength of no greater than 38 dBuV/m at the original service area contour.

SEA believes there is a better way to allow necessary site changes, while, at the same time, avoiding cases of mutual exclusivity. In this regard, SEA is aware of the Comments being filed this date by the American Mobile Telecommunications Association

("AMTA"), and SEA supports the AMTA position in full. In essence, AMTA has proposed a solution that will accomplish the same objectives (i.e., allow licensees to relocate and avoid creating mutual exclusivity), but in a way that will not impose as great a procedural burden on the Commission's staff or upon the licensee community as the proposal advanced by the Commission in the 4th NPRM. Specifically, AMTA's proposal would allow licensees to relocate their facilities one-half the distance over 120 km toward any co-channel licensee, up to a maximum of 35 km.^{1/}

The burden imposed upon the Commission's staff and upon licensees would be much less under AMTA's "half-the-distance" approach than under the Commission's "contour adherence" proposal. As a practical matter, use of the Commission's "contour adherence" method first will require licensees to plot their original service contour and their new service contour resulting from the site relocation and power reduction. The second step will necessarily involve a comparison of the two contours by the Commission staff to ensure that, in accordance with the Commission's proposal, there is no expansion of the service area as defined by the original 38 dBuV/m contour. Obviously, the need to plot and review these contour comparisons will consume considerable time and expense on the part of licensees and those members of the Commission's staff who will review and process the modification applications.

1/ Under the AMTA proposal, licensees could relocate to shorter spacings than 120 km only with the consent of the co-channel licensee, as evidenced by a letter submitted concurrently with the modification application.

In contrast, computation using AMTA's "half-the-distance" approach is a very simple matter that can be performed quickly and efficiently by means of a computer using appropriate software programs and a database containing the latitude and longitude of all licensed 220 MHz stations, a procedure that lends itself easily to preparing modification applications by licensees and reviewing and processing them by the Commission's staff. With respect to the latter, the Commission's Mass Media Bureau is very familiar with the ease and facility of such programs for licensing FM broadcast stations, which is performed routinely on a mileage separation basis.^{2/} SEA is confident that the staff of the Commission's Wireless Telecommunications Bureau will be able to process applications based on AMTA's "half-the-distance" method much more quickly than if licensees were required to use the contour comparison method proposed by the Commission. In short, the AMTA approach can be implemented much more quickly and efficiently than the Commission's proposal, while achieving the all-important objective of avoiding mutual exclusivity. This, in turn, will expedite site changes and contribute to early implementation of the Phase II licensing program for the 220 MHz service that has been proposed by the Commission.

In the event the Commission should choose for some reason not to adopt the AMTA proposal and allow licensees only to modify their authorizations in accordance with the Commission's "contour adherence" methodology, SEA recommends a refinement to that approach. The Commission's proposal requires that licensees reduce power in order

^{2/} See 47 C.F.R. § 73.207.

to ensure that signal levels do not exceed the original contour at any location in the licensee's service area. However, the 4th NPRM did not mention use of directional antennas, and the inference to be drawn, therefore, is that the power reduction would cause an omnidirectional shrinkage of the relevant field strength contour. Clearly, this would be an inefficient and wasteful use of the spectrum -- it would cause a portion of the service area to be underpowered and therefore underserved. The Commission's proposed solution to this problem is to allow fill-in base stations,^{3/} a very complex and expensive solution. SEA recommends that the Commission allow the use of directional antennas to shape the ERP pattern from the new transmitter location to match the original contour. Attached as Appendix A is SEA's analysis illustrating how directional antennas can be used to enable the predicted field strength of the modified base station to stay below the 38 dBuV/m field strength limit at the contour while preserving the original service area coverage. SEA believes the use of directional antenna patterns is far superior to the multiple transmitter "fill-in" approach recommended by the Commission. The cost savings to licensees is itself a compelling motivation to adopt such an approach.^{4/}

Obviously, employing the Commission's "contour adherence" methodology as modified by SEA's recommendation regarding use of directional antennas will not remedy

3/ 4th NPRM at para. 10.


4/ While the Commission should allow multiple transmitter operations, it should not view such operations as the sole solution for maintaining original service area coverage.

the principal difficulty inherent in the Commission's proposal, i.e., the inordinate time and expense that will be required to compute and compare comparable contours. It is for this reason that SEA strongly recommends that the Commission adopt the AMTA proposal, which accomplishes all the objectives sought by all parties to this proceeding, including the Commission, but with a much lower penalty in terms of expense and delay.

In conclusion, SEA urges the Commission to adopt the "half-the-distance" approach described in detail in the AMTA Comments and to proceed expeditiously to allow 220 MHz licensees to modify their licenses with respect to transmitter location in accordance with the AMTA proposal.

Respectfully submitted,

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Attachment: Appendix A

APPENDIX A

Introduction

The following scenario serves to illustrate how the application of readily-available directional antennas can help facilitate the Commission's goals of:

- (1) permitting Phase I licensees to modify their base station locations
- (2) keep the predicted field strength of the modified base stations below a limit defined by the old site coordinates and,
- (3) permit licensees to maintain reasonable coverage over the original protected service area.

SEA believes that permitting the use of directional antennas will serve these purposes with the added benefit of economy.

Scenario

Original base station: HAAT = 1000 m, max ERP = 10 W (omnidirectional)

Proposed modification: New site 5 km away from original, HAAT = 1000 m.

Given the original site information and using Figure 10 of 47 C.F.R. ¶ 73.699, one can determine the predicted 38 dBuV/m contour. First, include the correction factors to make the Figure 10 model (1kW transmitter power, 9m receive antenna height) fit our case. The difference between the model's 1 kilowatt and our system's 10 watts is 20 dB. The Commission uses a 9 dB correction factor to account for the difference between a typical mobile receiving antenna height and the model's 30 m high receiving antenna.

$$38 \text{ dBuV/m} + 20 \text{ dB} + 9 \text{ dB} = 67 \text{ dBuV/m}$$

In Figure 10, 67 dBuV/m intersects with 1000 m transmitter antenna height at a distance of approximately 48 km. Therefore, the original service area contour is a circle of radius 48 km centered at the original system based station coordinates.

The new site will be removed 5 km from the original. The nearest distance to the original contour will be $48 - 5 = 43$ km. According to Figure 10, at 43 km, HAAT = 1000 m, and the other model parameters (1kW ERP and 9 m receive antenna height), the predicted field strength is approximately 69 dBuV/m, 2 dB above the 67 dBuV/m limit. Therefore, the ERP in the direction of the nearest point on the contour must be reduced by 2 dB at the new site.

The furthest distance to the contour from the new site will be $48 + 5 = 53$ km. According to Figure 10, at 48 km, HAAT = 1000 m, and the other model parameters

(1 kW ERP and 9 m receive antenna height), the predicted field strength is approximately 64 dBuV/m, 3 dB below the 67 dBuV/m limit. Therefore, the ERP in the direction of the further point on the contour can be increased by 3 dB at the new site.

A single antenna can easily accommodate both ERP requirements. Multiple-element exposed dipole antennas can deliver an antenna pattern as required above by adjusting the orientation of the antenna elements. The radiation pattern of a collinear antenna can be adjusted by use of a suitable reflector. Antenna manufacturers can supply antennas with specified radiation patterns. Mounting an antenna on the side of a tower (as opposed to the top) can distort the pattern of signal radiation in a predictable manner.

If the new system location is to be at a different HAAT or different (shorter) distances, the same simple analysis can be made and ERPs calculated. Distances of over 5 km require somewhat more rigorous analysis in order to guarantee that the 38 dBuV/m contour is not violated. Other, more exotic, directional antennas may be required. In cases of modifications requiring relocation of over 5 km, SEA believes, the Commission may require a more rigorous engineering analysis than that presented here.^{1/}

^{1/} Except for cases where the licensee is satisfied with simply reducing the omnidirectional ERP.

CERTIFICATE OF SERVICE

The undersigned hereby certifies that on this 13th day of September, 1995, caused copies of the foregoing "Comments" to be served by first class mail, postage prepaid to the following:

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